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The influence of low dose ion-irradiation on the mechanical properties of PMMA probed by nanoindentation

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Abstract

© Springer Science+Business Media Dordrecht 2015. The results of investigations of the influence of low dose B+-ion-irradiation (6.25 ´ 1014 ion/cm2) on the mechanical properties (hardness and elastic modulus) of polymethylmethacrylate (PMMA) using the nanoindentation tests with an ultra nano hardness tester are reported for the first time. It is established that the dependences of hardness and elastic modulus on the maximum indentation depth show major differences between pristine and ion-implanted samples in the range up to about 400 nm which is consistent with the maximum penetration depth of B+-ions into the PMMA matrix determined earlier by slow positron beam spectroscopy and SRIM simulation (stopping and range of ions in matter).

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Keywords

Ion irradiation, Nanoindentation, Polymethylmethacrylate